## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | The first quality score for referral letters in gastroenterology- a validation study |
| **AUTHORS** | Eskeland, Sigrun; Brunborg, Cathrine; Seip, Birgitte; Wiencke, Kristine; Hovde, Øistein; Owen, Tanja; Skogestad, Erik; Huppertz-Hauss, Gert; Halvorsen, Fred- Arne; Garborg, Kjetil; aabakken, lars; Lange, Thomas |

## VERSION 1 - REVIEW

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| **REVIEWER** | Sander Veldhuyzen van Zanten<br><br>Sander Veldhuyzen van Zanten, MD, MSc, MPH, PhD<br>Director, Division of Gastroenterology<br>AHS Zone Head, Edmonton GI<br>2-14A Zeidler Ledcor Centre<br>University of Alberta<br>Edmonton, AB T6G 2X8<br>e-mail: vanzanten@ualberta.ca<br><br>Executive Assistant: Karen Doring<br>e-mail: karen.doring@ualberta.ca<br>Admin Tel. 780-492-9840<br>Medical Office Assistant: Katarina Bava<br>e-mail: vanzclin@ualberta.ca<br>Patient Tel. 780-492-9864<br>Fax. 780-492-9865<br><br>To the editor, thanks for asking me to review the referral; I personally have a lot of interest in this area, and currently, together with several colleagues, have worked extensively on developing a standardized referral process. I believe the manuscript is worth publishing, but my comments made clear that the manuscript can be improved.<br><br>Perhaps, my major difficulty is in the selection of the 15 point items for each of the 9 referral indications. The face validity of some of these items is not high. Of course, this cannot be changed by the authors, but perhaps can be addressed in more detail in the discussion. I think if you decide to publish this, it would be helpful to consider an editorial to accompany this manuscript, and I would be interested in writing it. |
| **REVIEW RETURNED** | 08-Jul-2016 |

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| **GENERAL COMMENTS** | This reviewer is currently involved in developing standardized referral forms for outpatient consultations in luminal GI, and hepatology. As such, he has a special interest in this area. |

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| | First of all, the reviewer would like to congratulate the authors for carrying out this work and submitting it for publication. As the authors make clear the quality of referrals to GI leaves a lot to be desired. Indeed they demonstrate that on average of GI referrals are of mediocre quality. The current manuscript makes clear that there is room for a lot of improvement and their data provide ways in which this may be achieved.<br><br>Although this reviewer may sound somewhat critical, the comments are made in the spirit of hoping to generate discussion and indicate where improvements in the manuscript possibly can be made.<br><br>First, I will make some high level comments and then address points as they appear in the manuscript.<br><br>It is said that 75 – 80% of all the referrals are covered by the 9 indications that are mentioned. This is somewhat surprising as nothing is said about indications which I think are very common such as those for colon cancer screening, a family history of colon cancer or polyps or a personal history of polyps; is this because in Norway, such patients are managed separately from the general referral process to GI? If so, it should be listed.<br><br>I have a lot of comments about the key items that are listed for the 9 indications, and I do not necessarily agree with them all. That said, the authors decided that these were the important items, and used these in their project.<br><br>From the manuscript, it appears that in Norway, most? referrals are submitted electronically. This is not the standard in different countries. The relevant question is how electronic submission of referrals links to existing electronic medical records. For example, is the expectation, for example that actual lab or diagnostic imaging reports are attached or can the receiving physicians easily retrieve that information? For example, can a physician check easily that indeed hemoglobin is normal or an abdominal CT was normal or does that need separate verification? I have done measurements on this issue, and it can be quite time consuming.<br><br>Separately, does the referral process include patients that can or are referred for direct to endoscopy procedures such as gastroscopy and colonoscopy? In that case, it would be highly relevant not only to have a list of the patient medications, but it would be especially important to know whether the patient is on aspirin and/or another anti-platelet agents or anti-coagulants. In my opinion a referral will not be considered high quality if that information is lacking.<br><br>I would also be interested to know whether all referrals are accepted, and subsequently seen. In some countries, wait times to see a gastroenterologist are long and certainly from personal experience, I know that low quality referrals are more likely to be rejected in my institution where we definitely have an access problem. I also would like to see more information on how urgency is assessed. The referring physician and gastroenterologist may have a different opinion about the urgency of a referral. This is especially relevant for semi-urgent referrals.<br><br>I will now address some concerns I have about the different key items for the 9 referrals. First of all, the number of patients belonging |

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| | to different categories is markedly different. For example, the category, jaundice, abnormal liver enzymes is very broad, and would include primary liver disease, but also biliary and gall bladder problems, categories that would be handled very differently.<br><br>Going through some of the indications starting with dyspepsia I have difficulty accepting that fecal occult blood test is part of the work-up. This is unusual for upper GI disorders. To this reviewer it seems that non-response to a PPI, which I would not call anti-acid treatment, is a very important piece of information in the management of dyspepsia, and I would score it higher. I would not consider evidence of hematemesis, and true dysphagia as being part of dyspepsia. I was also surprised to see that fecal calprotectin is considered to be important. Is this test indeed widely available in Norway?<br><br>For jaundice and elevated liver enzymes, our expectation would be that as a minimum, an ultrasound has been done. This is a more specific than the term radiology. I also do not understand if a patient is referred for GI bleeding why an FOBT would be considered to be an important diagnostic test. Given this feedback, I wonder whether as a minimum the authors could be more explicitly state that further validation of the different items for each indication is required and may likely improve referral quality.<br><br>Selection of the 15 variables for each referral indication: this was done through a web page survey among 39 gastroenterologists. I believe in the discussion the point should be raised that likely with refinement that the TPS score might be better able to discriminate high from low quality referrals.<br><br>Separate from the TPS, a visual analog scale was used. I agree with the data that there was a moderate correlation between the VAS and TPS. In looking at table 1, this reviewer has difficulty believing that none of the 327 referred patients were informed of the referral.<br><br>Table 2 is perhaps the most important in the manuscript showing the only mediocre quality of the different referrals.<br><br>Most of the comments that I believe merit more explanation in the discussion have already been raised. Once again, this reviewer wants to stress that he applauds the authors for doing this work, and hopes that the comments are helpful in both improving the manuscript, and help focus subsequent work. |

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| **REVIEWER** | José Francois<br>University of Manitoba, Canada |
| **REVIEW RETURNED** | 11-Jul-2016 |

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| **GENERAL COMMENTS** | A very interesting study. Very well described methods, results sections.<br>One area needs some clarification - In the text, the authors state: "Also, referral letters in Norway are mainly generated electronically within the general national referral template,[35] and these general scores could consequently indicate a good referral letter, regardless of the description of the patient's symptoms and signs." It would be useful to the reader to understand what this template consists of (are items similar to the the one's on the Thirty Point Scale and if this |

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| | may have an impact.<br>In the section 'Impact of the study', authors further suggest that a tool to facilitate creation of high quality letters would be beneficial - what is link to the the general national referral template that exists? |

## VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Reviewer Name: Sander Veldhuyzen van Zanten

Please leave your comments for the authors below:

Reviewer comment: First of all, the reviewer would like to congratulate the authors for carrying out this work and submitting it for publication. As the authors make clear the quality of referrals to GI leaves a lot to be desired. Indeed they demonstrate that on average of GI referrals are of mediocre quality. The current manuscript makes clear that there is room for a lot of improvement and their data provide ways in which this may be achieved.
Although this reviewer may sound somewhat critical, the comments are made in the spirit of hoping to generate discussion and indicate where improvements in the manuscript possibly can be made.
First, I will make some high level comments and then address points as they appear in the manuscript.
It is said that 75 – 80% of all the referrals are covered by the 9 indications that are mentioned. This is somewhat surprising as nothing is said about indications which I think are very common such as those for colon cancer screening, a family history of colon cancer or polyps or a personal history of polyps; is this because in Norway, such patients are managed separately from the general referral process to GI? If so, it should be listed.

Answer from autors: This valuable comment as well as several of the following comments emphasize that we have not been clear enough about Norwegian particularities in the referral process. Therefore, we have adjusted the introduction and added a new paragraph to explain these matters.
There is no programmatic bowel cancer screening in Norway and unorganized screening is extremely sparse (unpublished data from the National quality registry). At present the only current CRC screening activity is the Bowel Cancer Screening Norway (BCSN) -a pilot on a national program, a population based trial recruiting participants by invitation. Polyp surveillance is organized by the hospital, consequently referral is not necessary.
These explanations are added in the new paragraph in the introduction.

Reviewer comment: I have a lot of comments about the key items that are listed for the 9 indications, and I do not necessarily agree with them all. That said, the authors decided that these were the important items, and used these in their project.
From the manuscript, it appears that in Norway, most referrals are submitted electronically. This is not the standard in different countries. The relevant question is how electronic submission of referrals links to existing electronic medical records. For example, is the expectation, for example that actual lab or diagnostic imaging reports are attached or can the receiving physicians easily retrieve that information? For example, can a physician check easily that indeed hemoglobin is normal or an abdominal CT was normal or does that need separate verification? I have done measurements on this issue, and it can be quite time consuming.

Answer from authors: It is correct that referral letters are largely transferred electronically in Norway. The referrals are not linked back to the referring GPs EHR system, as this is a one-way asynchronous message, transferring the referral as an XML file to the receiving hospital EHR system. Thus, the

referring GP needs to add all relevant information to the referral before sending, usually by copying and pasting from relevant documents in their EHR systems. If the lab/radiology is not added before sending, the GP can send this separately later on. However, this way of sending the information is suboptimal as the information may not have reached the hospital by the time the consultant assess the referral. Thus this information is of no value in the referral assessment.
As the reviewer also correctly points out the process of collecting the relevant information is also very time consuming and therefore the consultants do not prefer this way of transferring information. We have therefore only used the information that was available to the consultant at the time of reviewing the referral when assessing the quality of the referrals in this study. This is explained in the new paragraph in the introduction and in page 6, paragraph 4.

Reviewer comment: Separately, does the referral process include patients that can or are referred for direct to endoscopy procedures such as gastroscopy and colonoscopy? In that case, it would be highly relevant not only to have a list of the patient medications, but it would be especially important to know whether the patient is on aspirin and/or another anti-platelet agents or anti-coagulants. In my opinion a referral will not be considered high quality if that information is lacking.

Answer from authors: Open access endoscopy is the common practice all over Norway as stated in the new paragraph in the introduction.
We also agree with the reviewer's comment regarding the quality of referrals which do not contain information about anti-coagulants or anti-platelet agents. This is highly relevant information for the hospital when scheduling the patients for the procedure. In the information letter sent to the patients before the procedure, this issue is addressed by giving appropriate instructions regarding the management of such medications.
However, this does not improve the situation for the hospital personnel who are planning the procedure. In the score we have addressed this through the item current medical treatment. If this information is indeed added to the referral, we believe that this is sufficient information for the consultant in terms of medication information, as the anti-platelet agents or anti-coagulants would be easily spotted on the list. However, a separate sentence highlighting such medication would indeed be preferred over a general list of the patient's current medication.

Reviewer comment: I would also be interested to know whether all referrals are accepted, and subsequently seen. In some countries, wait times to see a gastroenterologist are long and certainly from personal experience, I know that low quality referrals are more likely to be rejected in my institution where we definitely have an access problem. I also would like to see more information on how urgency is assessed. The referring physician and gastroenterologist may have a different opinion about the urgency of a referral. This is especially relevant for semi-urgent referrals.

Answer from authors: Thanks for this valuable comment. In Norway, with a mainly publicly funded healthcare system, capacity issues are also a concern. Referrals are sent at the GPs discretion, but may be rejected if the indication is considered inappropriate. Many referrals are however accepted in spite of inappropriate indications. This puts additional pressure on the capacity of the health care system. One of the reasons for the acceptance of such inappropriate referrals may be the Norwegian health care legislation. The Norwegian law only allows rejection of referrals on the basis of poor indication, not as a consequence of poor quality of the referral letter. Consequently, referral letters with doubtful indication and a lack of essential information may be interpreted as appropriate seen in the light of "if all the missing information items were indeed positive, how would I assess the referral?"
The urgency of the referral should be stated by the referring GP in the referral. However, the consultant makes his/her own assessment of urgency and schedules a time for the procedure/consultation following the recommendations stated in the Norwegian Prioritization Guideline for gastroenterology or by clinical judgment at the time of the assessment of the referral. In this study, only 17.7% of the GPs stated the urgency of the referral (table 1).

The consultant's assessment of the urgency is the one that is used to decide the waiting time, although the GPs opinion may be considered.
These issues have been explained in the new paragraph in the introduction

Reviewer comment: I will now address some concerns I have about the different key items for the 9 referrals. First of all, the number of patients belonging to different categories is markedly different. For example, the category, jaundice, abnormal liver enzymes is very broad, and would include primary liver disease, but also biliary and gall bladder problems, categories that would be handled very differently.

Answer from authors: Yes, we acknowledge this important comment, but due to the relative low volume of referrals in this category together with the Norwegian Prioritization Guideline managing these referrals as one group, these referrals have been handled as one group when making the TPS.

Reviewers comment: Going through some of the indications starting with dyspepsia I have difficulty accepting that fecal occult blood test is part of the work-up. This is unusual for upper GI disorders. To this reviewer it seems that non-response to a PPI, which I would not call anti-acid treatment, is a very important piece of information in the management of dyspepsia, and I would score it higher. I would not consider evidence of hematemesis, and true dysphagia as being part of dyspepsia. I was also surprised to see that fecal calprotectin is considered to be important. Is this test indeed widely available in Norway?

Answer from authors: FOBT in dyspepsia referrals was an option available to the consultants who contributed to the selection of the variables in the TPS due to the relevance in detecting bleeding ulcers and upper GI cancers with dyspeptic symptoms. A positive FOBT is indeed not a feature typical for dyspepsia patients, but is nonetheless information important to rule out other more serious diseases. A general comment regarding this issue with the TPS has been added to the discussion (page 12, paragraph 1).
The question about the PPI vs anti-acid treatment is a highly relevant comment and will be corrected as PPI treatment was lost in the translation of the TPS items (corrected in appendix 1, dyspepsia). We also acknowledge that this information may deserve a higher score. In this article, we have presented the TPS as a result of the items selected by the participating consultants. There may be some items that deserve some modification in a later revision of the score, and a paragraph has been added to the discussion (page 14, paragraph 2).
We also agree that hematemesis and dysphagia are not part of the typical dyspeptic symptoms, but we think the consultants valued this information so highly to discriminate dyspepsia from other more serious diseases.
Calprotectin is indeed widely available in Norway and is thus expected by the consultants as a part of a thorough work-up in the context of lower abdominal symptoms.

Reviewer comment: For jaundice and elevated liver enzymes, our expectation would be that as a minimum, an ultrasound has been done. This is a more specific than the term radiology. I also do not understand if a patient is referred for GI bleeding why an FOBT would be considered to be an important diagnostic test. Given this feedback, I wonder whether as a minimum the authors could be more explicitly state that further validation of the different items for each indication is required and may likely improve referral quality.

Answer from authors: We do agree with the reviewer's comment regarding the type of radiology that is expected. The more general use of the term radiology may also be open for reconsideration, should the TPS be revised. A paragraph discussing this has been added to the discussion (page 13 paragraph 4).
Regarding the FOBT, we believe that this test was chosen for the situation where the patient is

referred with a question of whether or not the patient has a gastrointestinal bleeding. Such a patient may be referred under this indication in the context of e.g. anemia and abdominal pain, and the answer to the FOBT test will thus give valuable information.
The reviewer's suggestion of a statement of the need for further validation has been added to the manuscript (page 14, paragraph 2)

Reviewer comment: Selection of the 15 variables for each referral indication: this was done through a web page survey among 39 gastroenterologists. I believe in the discussion the point should be raised that likely with refinement that the TPS score might be better able to discriminate high from low quality referrals.

Answer from authors: We agree with the reviewer's feedback and have added some sentences about this to the discussion (page 14, paragraph 2).

Reviewer comment: Separate from the TPS, a visual analog scale was used. I agree with the data that there was a moderate correlation between the VAS and TPS. In looking at table 1, this reviewer has difficulty believing that none of the 327 referred patients were informed of the referral.

Answer from authors: We agree with the reviewer's comment regarding the patient information. However, it was not stated in the referral, and thus this information was unknown to the consultant upon assessing the referral. Indeed, the survey do not assess which symptoms/information about the patients that was known to the GP at the time of the referral, but rather which information he/she conveyed to the consultant through the referral letter.

Reviewer comment:Table 2 is perhaps the most important in the manuscript showing the only mediocre quality of the different referrals.

Answer from authors: We agree with the reviewer's comment.

Reviewer comment: Most of the comments that I believe merit more explanation in the discussion have already been raised. Once again, this reviewer wants to stress that he applauds the authors for doing this work, and hopes that the comments are helpful in both improving the manuscript, and help focus subsequent work.

Reviewer: 2

Reviewer Name: José Francois

Please leave your comments for the authors below:

Reviewer comment: A very interesting study. Very well described methods, results sections.
One area needs some clarification - In the text, the authors state: "Also, referral letters in Norway are mainly generated electronically within the general national referral template,[35] and these general scores could consequently indicate a good referral letter, regardless of the description of the patient's symptoms and signs." It would be useful to the reader to understand what this template consists of (are items similar to the the one's on the Thirty Point Scale and if this may have an impact.

Answer from authors: The template consists of the items stated in table 1 as indicated in the manuscript. Thus, this template is highly general, and does not contain symptom specific information as the TPS does, except for the items current medical treatment, previous medical history (table 1 and appendix 1). The title of table 1 has been modified to make this clearer to the reader.

Reviwer comment: In the section 'Impact of the study', authors further suggest that a tool to facilitate creation of high quality letters would be beneficial - what is link to the the general national referral template that exists?

Answer from authors: The authors believe that the template (table 1) is a good start, but that more symptom specific referral aids would be appropriate now that EHR systems allow for a much higher degree of flexibility than what the former paper based health records. Thus, a symptom-specific checklist could be a viable solution and the authors are currently involved in a trial testing such a solution.

**VERSION 2 – REVIEW**

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| **REVIEWER** | Sander Veldhuyzen van Zanten<br>University of alberta, edmonton, Canada |
| **REVIEW RETURNED** | 29-Aug-2016 |

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| **GENERAL COMMENTS** | I feel the authors have adequately addressed the comments I made during the first review. This paper is an important start in addressing content and quality of the consults to GI. In my own institution we have developed quite a different one but the essence is that there is room for a lot of improvement in the quality of refferrals<br><br>I think the paper may benefit from an editorial |